JOURNAL
OF THE
WASHINGTON ACADEMY OF SCIENCES

VOL. 22 MARCH 19, 1932 No. 6

BOTANY.—*The genus* Sanchezia *in Peru.*[1]

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The genus *Sanchezia*, belonging to the family Acanthaceae, consists mainly of shrubs having large, firm, subentire leaves, which are either bright green or, in a few species, conspicuously variegated along the main veins. The flowers, arranged in spikes or panicles, have tubular, small-lobed, red, yellow, or purple corollas. Inserted at the base of the corollas are two pairs of stamens, one pair long and usually exserted, the other shorter and sterile (staminodes). Floral bracts are present in all the species. In some they are small and inconspicuous, but in others they are large and bright red or yellow. The brilliant color of the inflorescence as a whole, in contrast to the bright green of the leaves, adds greatly to the attractiveness and beauty of these plants. They grow wild in the wet forest regions of the northern Andes, but being easily adaptable to cultivation they have been carried to widely separated countries, where, either as greenhouse plants or escapes, they readily flourish. I have examined such collections from Costa Rica, Cuba, Java, and Amboina.

Since the publication of an earlier paper[2] on *Sanchezia*, a large number of Peruvian specimens have been submitted to me for identification, among these nine undescribed species. It seems well worth while, therefore, to bring together in a single paper descriptions of all the Peruvian species (21) now known. The recent material has been obtained largely through the collecting of E. P. Killip and A. C. Smith, Llewelyn Williams, and Guillermo Klug. Further exploration will doubtless bring to light many additional species in this interesting and complex group.

[1] Published by permission of the Secretary of the Smithsonian Institution. Received January 22, 1932.

[2] E. C. Leonard, *Notes on the genus* Sanchezia. This Journal, **16**: 484–492. 1926.

KEY TO THE PERUVIAN SPECIES

Calyx lobes lanceolate, slender-acuminate.
Bracts 6.5 to 7 cm. long ..... **1. S. filamentosa.**
Bracts 2 cm. long or less.
Sterile bracts 1 to 1.5 cm. long, 4 to 5 mm. wide; corolla puberulent. **2. S. williamsii.**
Sterile bracts 4 to 5 mm. long, 1 to 2 mm. wide; corolla glabrous.
Leaf blades large, up to 25 cm. long and 12 cm. wide, glabrous; staminodes 2.5 cm. long, pilose ..... **3. S. oxysepala.**
Leaf blades smaller, up to 11 cm. long and 3.5 cm. wide; staminodes 1.8 cm. long or less, glabrous ..... **4. S. sprucei.**
Calyx lobes oblong, acute to rounded.
Bracts small, shorter than the calyx (sometimes exceeding the calyx in no. 5).
Inflorescence of 1 or more slender unilateral spikes (imperfectly unilateral in no. 5).
Leaves elliptic, abruptly narrowed at base, less than twice as long as broad; bracts 3 to 6 mm. long ..... **5. S. sylvestris.**
Leaves oblong-elliptic, gradually narrowed to base, more than twice as long as broad; bracts 8 to 25 mm. long.
Bracts acuminate, 1.6 to 2.5 cm. long, often equaling or exceeding the calyx ..... **6. S. rosea.**
Bracts obtuse or acute, 1.5 cm. long or less, much shorter than the calyx.
Corolla pubescent; calyx segments 1.7 to 2 cm. long; bracts glabrous ..... **7. S. loranthifolia.**
Corolla glabrous; calyx segments 1.4 to 1.6 cm. long; bracts puberulent ..... **8. S. tigrina.**
Inflorescence compact, not unilateral.
Leaves rounded or obtuse at base; flowers sessile in the axils of the bracts ..... **9. S. conferta.**
Leaves acute at base; flowers crowded at the ends of the peduncles. **10. S. capitata.**
Bracts large, longer than the calyx and concealing it.
Leaves pubescent ..... **11. S. ovata.**
Leaves glabrous.
Bracts connate at least to middle.
Lateral nerves 15 to 17 to a side; corolla lobes 5 mm. long. **12. S. cyathibracteata.**
Lateral nerves 9 to 12 to a side; corolla lobes 3 mm. long. **13. S. pennellii.**
Bracts not connate.
Corolla manifestly pubescent.
Bracts and bractlets pubescent; corolla 4 cm. long or less. **14. S. oblonga.**
Bracts and leaflets glabrous; corolla 5 to 6 cm. long. **15. S. macbridei.**
Corolla glabrous, or with a few hairs near the tip of the lobes.
Leaves gradually narrowed into winged petioles.
Corolla red; staminodes about 3 mm. long, glabrous above. **16. S. peruviana.**

Corolla yellow; staminodes about 2 cm. long, pilose above. **17. S. flava.**

Leaves plainly differentiated into leaf blade and petiole.

Corolla red.

Leaf blades entire or undulate; staminodes averaging 10 mm. long..... **18. S. rubriflora.**

Leaf blades coarsely crenate-dentate; staminodes averaging 4 mm. long..... **19. S. pulchra.**

Corolla yellow.

Leaf blades ovate, obtuse or rounded at base; inflorescence capitate or a short congested spike; staminodes glabrous or sparingly pubescent above..... **20. S. stenantha.**

Leaf blades oblong, elliptic, or oblong-obovate, narrowed at base; inflorescence spicate; staminodes pilose above. **21. S. killipii.**

1. **Sanchezia filamentosa** Lindau, Bull. Herb. Bois. II. **4**: 314. 1904.

Stem subquadrangular, pubescent; petioles 3 to 7 cm. long, pubescent; leaf blades ovate, up to 30 cm. long, 12 cm. wide, obliquely acuminate at apex, slightly narrowed at base, the nerves and midrib pubescent, the cystoliths 0.5 mm. long; inflorescence a terminal panicle, the branches unilateral, the bracts opposite, one sterile the other subtending 2 to 4 flowers; bracts and bractlets up to 7 cm. long, 3 to 5 mm. wide at base, produced into a long slender tip; calyx segments linear-lanceolate, 3.5 to 6 cm. long, 3 to 4 mm. wide at base, pubescent; corolla purple, 4.5 cm. long, pubescent toward tip, the lobes 3.5 mm. in diameter; stamens and staminodes pubescent at base, pilose above, the staminodes about 2 cm. long, slender and narrowly capitate.

Type collected near Pongo de Cainarachi, Department of Loreto, Peru, by E. Ule (no. 6401).

No material is available for my examination and the above description has been compiled from the original. This species should be easily recognized by its extremely long slender bracts and calyx segments.

2. **Sanchezia williamsii** Leonard, sp. nov.

Frutex, ramis gracilibus subtetragonis glabris vel pubescentibus; foliis ellipticis vel leviter obovatis basi acutis vel breviter in petiolum decurrentibus, apice acuminatis, margine integerrimis vel undulatis, glabris, nervis fulvo-pilosis exceptis, cystolithis conspicuis; spica interrupta; bracteis lanceolatis pubescentibus dense ciliatis; bracteolis anguste lanceolatis; calycis laciniis anguste lanceolatis; corolla rubra puberula.

Shrub; stem slender, quadrangular with rounded angles, glabrous or slightly pubescent at the nodes; petioles 2 to 4 cm. long, channeled, glabrous, or pubescent above; leaf blades elliptic or slightly obovate, up to 16 cm. long, 6.5 cm. wide, acuminate at apex, acute at base and subdecurrent on the petioles, entire or undulate, glabrous except the nerves and midrib, these prominent and pilose with yellowish-brown ascending or spreading hairs 0.5 mm. long, the cystoliths 0.25 to 0.5 mm. long, prominent and numerous on upper surface, less so on lower, crowded and parallel on nerves and midrib; inflorescence an interrupted spike 10 to 22 cm. long, the lowermost internode about 5 cm. long, the others successively shorter toward the summit, all pubescent with ascending hairs up to 1 mm. long; bracts lanceolate, 10

to 15 (occasionally 20) mm. long, 3 to 5 mm. wide (bract subtending the flowers slightly larger than the opposite sterile one), acute or acuminate at apex, pubescent with ascending hairs, densely ciliate, the cystoliths prominent and crowded; flowers one to several, crowded on a short peduncle 1 to 5 mm. long; bractlets linear-lanceolate, otherwise similar to the bracts; calyx 2 to 2.8 cm. long, the segments linear-lanceolate, 2 to 3 mm. wide, sparingly pubescent without, densely so within, the hairs ascending; corolla (immature) red (?), puberulent, the lobes 2 mm. long, 1.5 mm. wide, shallowly emarginate; filaments glabrous; staminodes 3 mm. long (?); style 4 cm. long, glabrous.

Type in the U. S. National Herbarium, no. 1,444,810, collected at San Roque, Department of San Martín, Peru, altitude 1,350 to 1,500 meters, January or February, 1930, by Llewelyn Williams (no. 7701). Williams' no. 7215 from the same locality also belongs to this species.

This is closely related to *S. oxysepala*, but can be distinguished readily by its simple spike, its denser pubescence, and its larger bracts (10 to 15 mm. long). In *S. oxysepala* the spikes are sparingly branched at the base and the bracts are 8 mm. long or less.

3. **Sanchezia oxysepala** Mildbr. Notizbl. Bot. Gart. Berlin **9**: 983. 1926.

Stem quadrangular, glabrous; petioles 2 to 5 cm. long; leaf blades elliptic-ovate, up to 25 cm. long, 12 cm. wide, acuminate, repand-dentate, glabrous; inflorescence terminal, of one to several unilateral spikes; bracts opposite, those subtending the flowers 6 to 7 mm. long, the sterile one much smaller; bractlets 8 mm. long, 2 mm. wide; sepals linear-subulate, 2.5 to 3 cm. long, 2.5 mm. wide; corolla 5 cm. long, the lobes 5 to 6 mm. long, 4 mm. wide; stamens exserted, pilose; staminodes 2.5 cm. long, capitate, pilose.

Type collected at mouth of Río Santiago, Department of Loreto, Peru, by G. Tessmann (no. 3874a). Photograph in the U. S. National Herbarium and in the herbarium of the New York Botanical Garden.

No actual specimens have been seen by the writer.

4. **Sanchezia sprucei** Lindau, Bull. Herb. Boiss. **5**: 648. 1897.

Stem terete, pubescent; petioles 6 to 12 mm. long, pubescent; leaf blades elliptic, up to 11 cm. long, 4.5 cm. wide, acute at apex and base, sparingly pilose, the cystoliths prominent; inflorescence terminal, of one or more interrupted spikes; bracts (one subtending the flower, the opposite one sterile) ovate, 7 to 13 mm. long, 2 to 5 mm. wide, acuminate, pilose; bractlets lanceolate, 1.3 cm. long, 4 mm. wide; calyx segments 2 to 2.2 cm. long, 3.5 to 4.5 mm. wide, the margin pilose and subhyaline; corolla 3.8 cm. long, 9 mm. wide at middle, the lobes 3 mm. in diameter; stamens exserted, the filaments sparingly pilose; anthers 4 mm. long; staminodes 1.5 to 1.8 cm. long, glabrous; style 4.5 cm. long; stigma 4 mm. long; capsule 1.6 cm. long, 8-seeded.

Type collected near Tarapoto, Peru, by R. Spruce (no. 4325). Type collection in the Gray Herbarium; photograph in the U. S. National Herbarium.

Near *S. oxysepala*, but distinguished from that species by the smaller leaves, pubescent stems, and the shorter glabrous staminodes.

5. **Sanchezia sylvestris** Leonard, sp. nov.

Frutex, ramis subtetragonis glabris; foliis ellipticis vel oblongo-ellipticis basi obtusis apice abrupte breviterque acuminatis glabris, margine sinuato-

dentato; inflorescentia terminali paniculata; bracteis oppositis ovatis acutis subtiliter ciliatis; bracteolis ovatis obtusis parce puberulis ciliatis; calycis laciniis oblongis paullum inaequalibus; corolla punicea glabra, lobis ciliatis exceptis; filamentis parce pilosis; staminodiis basi tomentosis apice glabris.

Shrub 1 meter high; stem quadrangular with rounded angles, glabrous; petioles 2 to 3 cm. long, glabrous; leaf blades elliptic to oblong-elliptic, up to 17 cm. long, 10 cm. wide, abruptly narrowed to a slender tip, obtuse at base, shallowly sinuate-dentate, glabrous, the upper surface marked with numerous, very minute, papillate projections, the cystoliths rather numerous and prominent, closely parallel on the nerves and midrib; inflorescence a terminal panicle about 20 cm. long, composed of slender unilateral spikes; bracts opposite (one subtending a flower, the other sterile), ovate, 3 to 6 mm. long, 1 to 2 mm. wide, acute, minutely ciliate; bractlets ovate, 4 to 5 mm. long, 3 mm. wide, obtuse, sparingly puberulent and ciliolate; calyx segments oblong, slightly unequal, 9 to 10 mm. long, 2 to 3 mm. wide, obtuse and apiculate at apex, glabrous or inconspicuously and sparingly puberulent, furfuraceous toward tip, ciliolate; corolla 4 cm. long, pink, glabrous (except the finely ciliate lobes), 3 mm. broad at base, 7 to 8 mm. broad at throat, the lobes 3 mm. long, 2.5 mm. wide, emarginate; stamens 3.5 to 4 cm. long, the filaments flat and sparingly pilose, the anthers 5 mm. long; staminodes 1.5 cm. long, 0.5 mm. broad at base, flat and tomentose toward base, the upper portion glabrous, very slender and narrowly spatulate at tip; style 4 to 5 cm. long, glabrous; capsule 1.2 cm. long, 3 mm. broad, glabrous, or with a few appressed hairs near the tip.

Type in the U. S. National Herbarium, no. 1,461,741, collected in dense forest between Yurimaguas and Balsapuerto, Department of Loreto, Peru, altitude 135 to 150 meters, August 26, 1929, by E. P. Killip and A. C. Smith (no. 28093). Klug's 1653, collected in the Río Putumayo forest, is also of this species.

Sanchezia sylvestris is readily distinguished by its minute bracts, which are seldom more than 5 mm. long. In all other Peruvian species the bracts are 10 mm. long or more.

6. **Sanchezia rosea** Leonard, sp. nov.

Frutex, ramis subtetragonis glabris; foliis oblongo-ellipticis glabris, apice acuminatis basi acutis, margine leviter crenato-dentato; spica subunilaterali; bracteis ovato-lanceolatis glabris vel subtiliter ciliatis; bracteolis oblongo-ovatis glabris; calycis laciniis oblongis apice rotundatis et mucronulatis; corolla lutea glabra, lobis parce ciliatis exceptis; staminodiis basi tomentosis apice pilosis.

Low shrub; stem quadrangular with rounded angles, glabrous; petioles 2 to 4 cm. long, glabrous; leaf blades oblong-elliptic, up to 24 cm. long, 9 cm. wide, acuminate at apex, acute at base, shallowly crenate-dentate except the basal third (here entire), glabrous, the upper surface bearing minute papillate projections but these less numerous and conspicuous than in *S. sylvestris*, the cystoliths 0.5 mm. long; inflorescence spicate, imperfectly unilateral; bracts opposite (one subtending a sessile cluster of several flowers, the other slightly smaller, sterile, or subtending a single flower), ovate-lanceolate, 1.6 to 2.5 cm. long, 6 to 11 mm. wide near base, gradually narrowed to a slender tip, glabrous or minutely ciliate, the cystoliths parallel and rather prominent; bractlets oblong-ovate to oblong, 6 to 16 mm. long, 2 to 5 mm.

wide, glabrous; calyx segments oblong, equal or nearly so, 1.5 to 1.8 cm. long, 2 to 4 mm. wide, rounded and mucronulate at apex, conspicuously puberulent and ciliate at tip, otherwise glabrous, the cystoliths minute and parallel; corolla light red, glabrous without except for a few scattered hairs on the margin of the lobes, glabrous within except for a white tomentum about the insertion of the stamens, 4 to 5 cm. long, 3 mm. broad at base, 1 cm. broad at throat, slightly constricted at mouth, the lobes 3 mm. long, 2 mm. wide, rounded and emarginate at apex; stamens exserted about 5 mm., the filaments sparingly pilose, the anthers 5 mm. long; staminodes 1.8 cm. long, ending in a flat spatulate tip 0.75 mm. wide, white-tomentose at base, otherwise pilose with spreading hairs 1 to 2.5 mm. long; style slightly exceeding the stamens.

Type in the U. S. National Herbarium, no. 1,461,695, collected in woods along the lower Río Huallaga, Yurimaguas, Department of Loreto, Peru, altitude about 135 meters, August 25, 1929, by E. P. Killip and A. C. Smith (no. 28040).

Sanchezia rosea is related to *S. tigrina*, from which it differs mainly in its thinner leaf blades, longer bracts, and pilose staminodes. Although it agrees with *S. loranthifolia* in having pilose staminodes, it does not possess the puberulent corolla and firm dark leaf blades of that species.

7. **Sanchezia loranthifolia** Lindau, Bull. Herb. Boiss. II. **4**: 314. 1904.

Stem quadrangular, glabrous; leaf blades oblong, up to 18 cm. long and 5 cm. wide, acuminate at apex, narrowed at base to a short petiole, glabrous, firm and dark colored, the cystoliths conspicuous; inflorescence a terminal panicle, the flowers in clusters of 4 to 6 crowded in the axil of one of each pair of bracts; bracts ovate, obtuse, up to 1.6 cm. long, 6 mm. wide; bractlets up to 1.4 cm. long, 3.5 mm. wide; calyx segments unequal, 1.7 to 2 cm. long, 3 to 4 mm. wide; corolla red, 4 mm. wide at base, 9 mm. wide at throat, puberulent toward tip, the lobes 5 mm. long, 3 mm. wide; stamens 4.2 cm. long, pilose; staminodes 1.4 to 1.7 cm. long, pilose, spatulate at tip; style 5 cm. long, glabrous; capsule 1.7 cm. long, 2.5 mm. in diameter, glabrous.

Type collected along the Cumbaso River, near San Pedro, Department of Loreto, Peru, by E. Ule (no. 6820).

I have seen no material of this species, and the above description is compiled from the original.

8. **Sanchezia tigrina** Leonard, sp. nov.

Frutex, ramis tetragonis glabris, nodis parce pubescentibus exceptis; foliis oblongo-ellipticis basi acutis, apice acuminatis glabris, marginibus integerrimis vel undulatis; inflorescentia terminali paniculata, spicis pluribus unilateralibus; bracteis oblongis vel oblongo-ovatis puberulis, margine subscarioso; bracteolis oblongis; corolla glabra, lobis parce ciliatis exceptis; staminodiis basi tomentosis apice glabris.

Shrub; stem quadrangular, glabrous or sparingly pubescent at nodes; petioles up to 2.5 cm. long, channeled, sparingly puberulent above, glabrous beneath; leaf blades oblong-elliptic, up to 25 cm. long, 8 cm. wide, narrowed and acuminate at apex, narrowed at base, firm, drying olive-brown, entire and undulate, both surfaces glabrous, the upper marked by numerous minute papillae, the cystoliths 0.5 to 0.75 mm. long; inflorescence a terminal panicle

consisting of several unilateral spikes, the lowermost node 1 to 3 cm. long, the others successively shorter, pubescent, the flowers in clusters of 3 or 4, or solitary, sessile in the axil of one of each pair of bracts, the opposite bract sterile; bracts oblong to oblong-ovate, up to 1.7 cm. long, 7 mm. wide, acute at apex, puberulent, the margin subscarious, ciliolate; bractlets oblong, up to 15 mm. long, 5 mm. wide, obtuse; calyx segments oblong, 1.5 to 1.7 cm. long, 3 to 5 mm. broad, obtuse and sparingly pubescent at apex, the margin scarious; corolla glabrous except for a few scattered hairs at the margin of the lobes, 4.5 cm. long, 3 mm. broad at base, slightly contracted, 1.2 cm. broad at mouth, the lower portion of the throat streaked with brown (dry flower), the lobes 5 mm. long, 4 mm. wide, shallowly emarginate, conspicuously reticulate; filaments white-tomentose at base, sparingly pilose above; anthers 4 mm. long; staminodes 1.5 to 1.8 cm. long, white-tomentose below, glabrous above, narrowly capitate; style 5 to 6 cm. long, glabrous; stigma linear, one lobe 2 mm. long, the other vestigial.

Type in the U. S. National Herbarium, no. 1,444,803, collected at Iquitos, Department of Loreto, Peru, altitude 120 meters, October, 1929, by Llewelyn Williams (no. 3622).

This species is closely related to *S. loranthifolia*, but is distinct in its glabrous corolla, puberulent bracts, and smaller calyx. The specific name was chosen because of the peculiar markings on the lower part of the corolla throat, a character found in only a few species of *Sanchezia*.

The color of the flowers can not be determined with any degree of certainty from the type. Judging from the closely related species *S. sylvestris*, *S. rosea*, and *S. loranthifolia*, it may be inferred that they are either red or pink.

9. Sanchezia conferta Leonard, sp. nov.

Frutex, ramis tetragonis glabris, nodis pubescentibus exceptis; foliis ovatis glabris, basi rotundatis vel obtusis, apice acuminatis, margine sinuato-dentato; spica densa, floribus confertis; bracteis ovatis acutis vel obtusis; bracteolis oblongis obtusis pubescentibus; calycis laciniis oblongo-lanceolatis paullum inaequalibus; corolla glabra, lobis pilosis exceptis; staminodiis angustis glabris vel parce pubescentibus.

Stem quadrangular, glabrous or pubescent at the nodes; petioles up to 2 cm. long, channeled, glabrous; leaf blades ovate, up to 14 cm. long and 6 cm. wide, acuminate at apex, rounded or obtuse at base, shallowly sinuate-dentate, glabrous, the cystoliths about 0.5 mm. long, inconspicuous, surrounded by minute papillate projections; inflorescence terminal, the flowers numerous and crowded in the axils of the bracts, the internodes short and concealed by the flowers, pubescent; bracts ovate, up to 1.5 cm. long, acute or subobtuse at apex; bractlets oblong, subobtuse, pubescent, much smaller than the bracts; calyx segments subequal, oblanceolate, 2 to 2.3 cm. long, 2 to 2.5 mm. wide at base, 2.5 to 4 mm. wide above middle, acute at apex, thin, pubescent without with ascending hairs up to 0.75 mm. long, glabrous within; corolla 4.5 cm. long, 2.5 mm. broad at base, 8 mm. broad at throat, glabrous except for the lobes, these 4 mm. long, 3.5 mm. wide, emarginate, rather conspicuously pilose with hairs up to 0.5 mm. long; filaments white-tomentose at base, sparingly pilose above; staminodes 10 mm. long, linear, glabrous, or bearing a few minute hairs at the margin; style glabrous.

Type in the U. S. National Herbarium, no. 1,359,680, collected in dense

forest on Pichis trail to Yapas, Department of Junín, Peru, altitude 1,350 to 1,600 meters, June 29, 1929, by E. P. Killip and A. C. Smith (no. 25479).

Although evidently related to the small-bracted group of *Sanchezia* (*S. sylvestris*, *S. rosea*, *S. loranthifolia*, and *S. tigrina*), this species is strongly differentiated by its compact inflorescence, larger calyx, and shorter staminodes.

10. Sanchezia capitata (Nees) Lindau, Bull. Herb. Boiss. II. **4**: 315. 1904.
Ancylogyne capitata Nees in DC. Prodr. **11**: 222. 1847.

Shrub up to 2 meters high; stem subquadrangular, glabrous; petioles 3 to 4 cm. long, glabrous; leaf blades ovate to obovate, up to 28 cm. long, 9 cm. wide, acuminate, gradually narrowed from about the middle to base, undulate-crenate, entire at base, glabrous; inflorescence terminal, the flowers crowded in several compact heads up to 4 cm. broad on stout peduncles about 3 cm. long; bracts red, oblong, up to 5 mm. long, acute; calyx segments (mature) linear-oblong, 3.3 to 3.5 cm. long, 4 to 5 mm. wide, obtuse or rounded at apex, glabrous; corolla 2.5 cm. long, red; capsule 1 to 1.2 cm. long, 3 to 4 mm. broad; seeds lenticular, 4.5 mm. broad, about 1 mm. thick, brown.

Type collected at Pangoa, Peru, by A. Mathews (no. 1230).

Peruvian specimen examined.—

JUNÍN: Pichis Trail, between San Nicolas and Azupizú, 650 to 900 meters, *Killip & Smith* 26092.

This specimen agrees very well with Nees' brief description of *Ancylogyne capitata*, at least in respect to the leaves and inflorescence. The Killip and Smith plant is well beyond the flowering stage, and no corollas are present.

11. Sanchezia ovata R. & P. Fl. Peruv. Chil. **1**: 7. *pl. 8, fig. c.* 1798.
Sanchezia glabra Pers. Syn. Pl. **1**: 24. 1805.

Stem quadrangular, glabrous; leaf blades ovate, acuminate, entire, pubescent; inflorescence a terminal spike, the flowers sessile and crowded in the axils of the purple, ovate, acute, concave bracts; bractlets oblong, emarginate, purplish; calyx segments oblong, rounded; corolla yellow, glabrous; filaments hirsute except at base; staminodes about 4 mm. long.

Reported from Cuchero, Pozuzo, and Pillao, Peru, by Ruiz and Pavon.

As no material is available for my examination, the description is compiled from the original.

12. Sanchezia cyathibracteata Mildbr. Notizbl. Bot. Gart. Berlin **9**: 267. 1925.

Stem stout, glabrous; petioles 4 to 6 cm. long; leaf blades oval, up to 30 cm. long, 16 cm. wide, obtuse at apex, subcuneate at base, coarsely crenate-undulate, the nerves 15 to 17 on each side of midrib; inflorescence a spike up to 20 cm. long, the internodes 3 to 4 cm. long; bracts ovate, 4 to 5 cm. long, connate to middle or beyond; flowers numerous, sessile; calyx segments unequal, 1.3 to 1.6 cm. long, 3 to 4 mm. wide, rounded at apex; corolla glabrous, yellow, 5 cm. long, the throat 8 mm. broad, the lobes 5 mm. long, 3 mm. broad; filaments 4 cm. long; anthers 6 mm. long; staminodes 5 mm. long.

Type collected at the mouth of the Capanahua River, eastern Peru, by G. Tessmann (no. 3134).

The relationship between this species, the type of which I have not seen, and *S. pennellii* is extremely close, the main differences lying in the number of lateral nerves of the leaves and in the size of the corolla lobes. Further material may show that the two are conspecific.

13. **Sanchezia pennellii** Leonard, Journ. Washington Acad. Sci. **16**: 488. 1926.

Stem obscurely quadrangular, glabrous; petioles up to 4 cm. long; leaf blades elliptic to elliptic-obovate, up to 30 cm. long, 13 cm. wide, abruptly narrowed to a blunt tip, narrowed at base, shallowly crenate, glabrous, the lateral nerves 9 to 12 to a side; inflorescence a terminal spike; bracts ovate, up to 5 cm. long and 3.5 cm. wide, connate at base, acute to obtuse at apex, red; sepals ligulate-obovate, 1 to 1.5 cm. long, 2 to 5 mm. broad; corolla yellow, 4 to 5 cm. long, 6 to 7 mm. broad at throat, the lobes 3 mm. long, rounded and emarginate at apex; filaments pilose; staminodes 4 to 5 mm. long; style glabrous.

Type collected at Vuelta de Acuña, Magdalena River, Department of Antioquía, Colombia, by F. W. Pennell (no. 3798).

RANGE: Panama; Colombia; Peru.

Peruvian specimens examined.—

LORETO: Dense forests at Yurimaguas, Lower Río Huallaga, about 135 meters, *Killip & Smith* 27993. Dense forests, Santa Rosa, lower Río Huallaga below Yurimaguas, 135 meters, *Killip & Smith* 28829.

The inflorescence of both Peruvian specimens is immature and the corollas are not fully developed; the leaves and bracts, however, agree well with those of specimens from Panama and Colombia.

14. **Sanchezia oblonga** R. & P. Fl. Peruv. Chil. **1**: 7. *pl. 8, fig. b.* 1798.
Sanchezia hirsuta Pers. Syn. Pl. **1**: 24. 1805.

Stem glabrous; petioles winged, connate; leaf blades oblong-lanceolate, acuminate, glabrous; inflorescence a terminal spike with a few short lateral branches; bracts ovate, red, pubescent; bractlets linear, hirsute, red; calyx segments rounded at apex, yellow; corolla yellow; filaments hirsute; staminodes 4 to 5 mm. long.

Reported from Cuchera, Pozuzo, and Pillao, Peru, by Ruiz and Pavon.

15. **Sanchezia macbridei** Leonard, Journ. Washington Acad. Sci. **16**: 487. 1926.

Stem glabrous; petioles winged; leaf blades up to 30 cm. long, 12 cm. wide, acuminate at tip, narrowed to a somewhat clasping base, undulate-dentate, glabrous; inflorescence spicate, or occasionally with a few lateral branches; bracts ovate, up to 5 cm. long, 3 cm. wide, red, glabrous, the lower long-acuminate, the upper obtuse at apex; bractlets oblong, up to 2.5 cm. long, 1 cm. wide, obtuse at tip; sepals 1.5 to 1.8 cm. long, 2 to 4 mm. wide, rounded at apex; corolla yellow, the tube up to 5 cm. long, finely appressed-pubescent, the lobes 4 to 5 mm. long, 2.5 mm. wide; filaments 4.5 cm. long, pubescent below with white hairs 0.5 mm. long, sparingly pilose above with hairs up to 1.5 mm. long; staminodes 1.5 to 1.8 cm. long, white-pubescent at base, glabrous at tip; style 6 cm. long, pubescent toward base.

Type collected at the mouth of the Chinchao River, Pampayacu, Peru by J. F. Macbride (no. 5056).

Peruvian specimens examined.—

LORETO: Soledad, Río Itaya, 110 meters, in dense forests, *Killip & Smith* 29549.

HUÁNUCO: Pampayacu, *Macbride* 5056 (type).

JUNÍN: La Merced, 700 meters, thickets, *Killip & Smith* 23411.

AYACUCHO: Río Apurimac Valley, near Kimpitiriki, 400 meters, edge of forest along beach, *Killip & Smith* 22954. Densely forested valley at Ccarrapa, between Huanta and Río Apurimac, 1,500 meters, *Killip & Smith* 23205.

This species is readily recognized by its large bracts and its conspicuous, bright yellow, pubescent flowers.

16. Sanchezia peruviana (Nees) Rusby, Mem. Torrey Club 6: 103. 1896.

Ancylogyne peruviana Nees in DC. Prodr. 11: 222. 1847.

Stem quadrangular, glabrous; leaf blades oblong-elliptic or obovate, up to 35 cm. long, 15 cm. wide, acuminate at apex, narrowed from below middle to a winged petiole, sinuate-dentate, glabrous; inflorescence a terminal spike up to 20 cm. long, the lowermost internode up to 8 cm. long, the others successively shorter, the upper ones hidden by the flower clusters; bracts opposite, ovate, up to 3.5 cm. long, 4 cm. wide, obtuse, bright red, glabrous; bractlets oblong; calyx segments unequal, 2.2, 2.5, and 3 cm. long, 2 to 7 mm. wide, rounded at apex; corolla 4 cm. long, red, glabrous, or the lobes sparingly ciliate; filaments tomentose at base, pilose above, the hairs spreading, up to 2 mm. long; staminodes 2 to 3 mm. long, tomentose at base, glabrous above.

Type collected at Sesuija, Peru, by Mathews (no. 1221).

RANGE: Peru and Bolivia.

Peruvian specimens examined.—

SAN MARTÍN: San Roque, 1,350 to 1,500 meters, *Williams* 6933.

JUNÍN: Wooded valley, La Merced, 1,200 meters, *Schunke* 292; *Killip & Smith* 24080.

Sanchezia peruviana has inflorescence and flower parts similar to those of *S. munita* (Nees) Planch., a native of Brazil, but is distinguished by the character of the leaves. In *S. munita* the petioles are wingless, and the leaf blades, usually under 20 cm. in length, are entire. On the other hand, the petioles of *S. peruviana* are broadly winged and the blades are sinuate-dentate.

17. Sanchezia flava Leonard, sp. nov.

Frutex, ramis tetragonis glabris; foliis oblongo-ellipticis vel oblongo-obovatis glabris, apice acuminatis, basi acutis, margine sinuato-dentato; petiolis alatis; spica simplici vel parce divisa; bracteis ovatis, infimis acutis rubris, summis obtusis flavis; bracteolis oblongis; calycis laciniis oblongo-ovatis rotundatis inaequalibus; corolla lutea glabra, lobis parce ciliatis exceptis; staminodiis gracilibus pilosis.

Shrub 1 to 2 meters high; stem quadrangular, glabrous; leaves narrowed into short, winged petioles; leaf blades oblong-elliptic to oblong-obovate, up to 30 cm. long, 13 cm. wide, acuminate at apex, acute at base, rather shallowly sinuate-dentate, glabrous; inflorescence spicate, simple or bearing one or more branches at the basal node, the upper nodes hidden by the bracts; bracts ovate, up to 4 cm. long, 3 cm. wide, the lower acute and bright red, the upper obtuse and yellow; bractlets oblong; calyx segments unequal, oblong-ovate, 2 to 2.5 cm. long, 2 to 7 mm. wide, rounded at apex; corolla bright yellow, glabrous, or with a few minute hairs near the tip of the lobes,

about 5 cm. long, 7 mm. broad, the lobes suborbicular, about 3.5 mm. in diameter; filaments finely pubescent below, pilose above with hairs 2 mm. long; staminodes 2 cm. long, slender and pilose above; ovary glabrous; style 5 cm. long, rather densely pilose below with hairs 0.5 mm. long, glabrous above.

Type in the U. S. National Herbarium, no. 1,358,997, collected in dense forest of the Schunke Hacienda, above San Ramón, Department of Junín, Peru, altitude 1,400 to 1,700 meters, June 8, 1929 by E. P. Killip and A. C. Smith (no. 24640).

This differs from *S. peruviana* in its yellow flowers and long slender pilose staminodes.

18. Sanchezia rubriflora Leonard, sp. nov.

Frutex, ramis tetragonis glabris; foliis oblongo-ellipticis vel leviter obovatis glabris, apice acuminatis, basi acutis, margine integerrimo vel leviter crenato; spica terminali; bracteis infimis lanceolatis acuminatis, summis ovatis obtusis rubris; bracteolis oblongis obtusis; calycis laciniis paullum inaequalibus angustis oblongo-ovatis apice rotundatis glabris; corolla rubra glabra vel lobis apice parce pilosis; staminodiis angustis, basi tomentosis apice glabris.

Shrub 2 or 3 meters high; stem quadrangular, glabrous; petioles up to 4 cm. long, glabrous; leaf blades oblong-elliptic or slightly obovate, up to 25 cm. long, 12 cm. wide, acuminate at apex, acute or acutish at base, entire or shallowly crenate, glabrous (nerves and midrib bright yellow in *Macbride* 4665); inflorescence a terminal spike, the lowermost internode up to 9 cm. long, the others successively shorter, those near the tip hidden by the bracts; lowest pair of bracts lanceolate, 2 cm. long, 2 cm. wide near the base, gradually narrowed to a slender tip, the upper bracts ovate, smaller, obtuse, all red and glabrous; bractlets oblong, obtuse; flowers several in each axil; calyx segments subequal, narrowly oblong-ovate, 1.8 to 2 cm. long, 3 to 5 mm. wide, rounded at tip, glabrous; corolla red, glabrous or with a few hairs near tip of lobes, 4 to 5 cm. long, 2 mm. in diameter at base, 7 mm. wide above base, the lobes 3 mm. long, 2.5 mm. wide, emarginate; stamens 4 to 5 cm. long, the filaments white-tomentose below, sparingly pilose above with hairs 1 mm. long; staminodes linear, about 10 mm. long, white-tomentose below, glabrous above; ovary and style glabrous, or the style bearing a few long hairs near base.

Type in the U. S. National Herbarium, no. 1,460,617, collected in dense forest at Cahuapanas, Río Pichis, Department of Junín, Peru, altitude about 340 meters, July 20, 1929, by E. P. Killip and A. C. Smith (no. 26768).

Additional Peruvian specimens examined.—

LORETO: La Victoria, Amazon River, *Williams* 2880.

HUÁNUCO: Pozuzo, *Macbride* 4665.

This closely resembles *S. munita*, of western Brazil, but that species has staminodes about 2 mm. long (not 10 mm. long or more, as in *S. rubriflora*). Macbride's no. 4665 was erroneously cited in my previous paper as *S. peruviana*.

19. Sanchezia pulchra Leonard, sp. nov.

Frutex, ramis tetragonis glabris; foliis obovatis glabris, basi cuneatis, apice breviter acuminatis, margine crasse crenato-dentato; spica terminali; bracteis infimis lanceolatis glabris, reliquiis ovatis glabris rubris; bracteolis oblongis obtusis; calycis laciniis inaequalibus spathulatis; corolla luteo-

rubra glabra, lobis apice pilosis exceptis; staminodiis basi tomentosis, apice glabris.

Suffrutescent, 1 meter high; stem quadrangular, glabrous; petioles up to 6 cm. long, glabrous; leaf blades obovate, up to 30 cm. long, 16 cm. wide, rounded or abruptly narrowed to a short acumen, cuneate at base, coarsely crenate-dentate, glabrous; inflorescence a terminal spike, the flowers clustered in the axil of the bracts, the lowermost internode up to 5 cm. long, the others partially hidden by bracts and flowers; lowermost bracts lanceolate, up to 7 cm. long, 2.5 cm. wide near base and gradually narrowed to tip, the others ovate, acute, all dark red and glabrous; bractlets oblong, obtuse at apex; calyx segments unequal, spatulate, 1.4 cm. long, 3 to 4 mm. wide toward the rounded tip, gradually narrowed to 2 mm. at base, glabrous, the margin subscarious; corolla orange-red, glabrous except for a tuft of hairs at tip of lobes and a white tomentum at insertion of stamens, 4 to 4.5 cm. long, the tube 2 mm. broad, the throat 6 to 8 mm. broad, the lobes about 3 mm. long and broad, emarginate, reticulate-veined; filaments white-tomentose at base, pilose above with hairs up to 1 mm. long; staminodes 3 to 4 mm. long, white-tomentose except for the glabrous tip; ovary and style glabrous.

Type in the U. S. National Herbarium, no. 1,461,526, collected in dense forest at Puerto Arturo, lower Río Huallaga below Yurimaguas, Peru, August 24, 1929, by E. P. Killip and A. C. Smith (no. 27842).

Additional Peruvian specimens examined.—

LORETO: Forest, Mishuayacu, near Iquitos, 100 meters, *Klug* 667. Lower Río Huallaga, 155 to 210 meters, *Williams* 5143.

JUNÍN: Dense forest, Puerto Bermudez, 375 meters, *Killip & Smith* 26447.

This is distinguished from *S. rubriflora* and *S. pulchra* by its large, obovate, coarsely crenate-dentate leaves. It is further differentiated from *S. rubriflora* by its short staminodes.

Killip & Smith's 26447, from Puerto Bermudez, is doubtfully referred to *S. pulchra*. In this specimen the inflorescence is very immature, and the upper pair of leaves have broadly winged, clasping petioles, although the second pair are typically slender-petioled.

20. **Sanchezia stenantha** Leonard, Journ. Washington Acad. Sci. **16**: 489. 1926.

Stem quadrangular; petioles slender, 4 to 6 cm. long; leaf blades ovate to oblong-ovate, up to 25 cm. long, 12 cm. wide, acuminate at apex, rounded or obtuse at base, entire or undulate, glabrous; inflorescence a terminal spike (occasionally capitate), the lowermost internode up to 7 cm. long, the others much shorter and hidden by the bracts; bracts ovate, concave, up to 4 cm. long, 2.5 cm. wide, obtuse or acutish at apex, bright red; bractlets oblong-obovate; sepals equal, obovate, narrowed to a slender base, rounded at apex, about 1.5 cm. long, 4 to 8 mm. wide; corolla bright yellow, glabrous (lobes sparingly ciliate), 4 to 5 cm. long, 6 to 7 mm. broad; filaments white-pubescent at base, sparingly pilose above with hairs about 1 mm. long; staminodes 1.3 to 1.4 cm. long, white-pubescent below, glabrous above; style glabrous.

Type collected at Pozuzo, by J. F. Macbride (no. 4634).

Peruvian specimens examined.—

HUÁNUCO: Pozuzo, 650 meters, *Macbride* 4634 (type).

JUNÍN: Dense forests, Yapas, Pichis Trail, 1,350 to 1,600 meters, *Killip & Smith* 25472. Thickets, Meriatiriani, Pichis Trail, 500 meters, *Killip & Smith* 26207. Dense forest, Río Paucartambo Valley, near Perene Bridge, 700 meters, *Killip & Smith* 25287.

A well-marked species, easily recognized by the ovate, nearly entire leaf blades with rounded bases, and by the large compact spike of bright yellow flowers.

21. **Sanchezia killipii** Leonard, sp. nov.

Frutex, ramis tetragonis glabris; foliis oblongo-ellipticis glabris utrinque acutis, margine undulato; spica terminali; bracteis acutis glabris; bracteolis oblongis obtusis; calycis laciniis oblongis inaequalibus obtusis glabris; corolla lutea glabra; staminodiis basi tomentosis, apice pilosis.

Shrub about 1 meter high; stem quadrangular, glabrous; petioles up to 1.5 cm. long, glabrous; leaf blades oblong-elliptic, up to 18 cm. long, 7 cm. wide, narrowed at both ends, glabrous, entire or shallowly undulate; inflorescence a terminal spike, the flowers clustered in the axils of the bracts (sometimes short secondary spikes present in the axils of the lower bracts), the lowermost internode 3.5 cm. long, the others successively shorter, about equaling the flower clusters; bracts (lowermost pair not seen) ovate, up to 2.2 cm. long, 1.8 cm. wide, acute, glabrous; bractlets oblong, obtuse; calyx segments oblong, subequal, 1.8 to 2 cm. long, 4 to 6 mm. wide, obtuse at apex, narrowed at base, glabrous; corolla yellow, glabrous except for a white tomentum at insertion of stamens, 4 cm. long, 3 mm. wide at base, 9 mm. wide at middle, 6 mm. wide at mouth, the lobes 3 mm. long, 3.5 mm. wide, emarginate; filaments white-tomentose at base, pilose above with hairs up to 2 mm. long; staminodes about 15 mm. long, white-tomentose below, pilose above, the hairs most numerous and longest just below the slightly enlarged curved tip; ovary and style glabrous.

Type in the U. S. National Herbarium, no. 1,462,404, collected in dense forests of Santa Rosa, lower Río Huallaga below Yurimaguas, Peru, altitude about 135 meters, Sept. 4, 1929, by E. P. Killip and A. C. Smith (no. 28967).

In the character of the staminodes this species agrees with *S. flava*, but can be distinguished by its well-defined, wingless petioles.

ENTOMOLOGY.—*New species of Sphingidae and Saturniidae in the U. S. National Museum.*[1] W. SCHAUS, Bureau of Entomology. (Communicated by HAROLD MORRISON.)

The new species described herein have been received within recent times and are a valuable addition to the national collections. They include 15 new species, one subspecies, two races, and one aberration.

SPHINGIDAE

Protoparce camposi, new species

Male.—Palpi iron gray above, white underneath. Head, collar, and tegulae iron gray; a white spot at base of antenna and at side of neck. Thorax dark olive gray. Abdomen above black, thickly mottled with white and

[1] Received January 13, 1932.

pinkish buff scales, leaving a dorsal interrupted black line and subdorsal white spots; three large lateral chrome spots on basal segments, broadly edged sublaterally with black; sublateral segmental white lines connected by a wavy white line; venter whitish with transverse gray bands. Fore wing fuscous black; a short white basal line from subcostal to below cell, a patch of white hairs at base of inner margin; an antemedial white lunular line, outbent on costa, outangled in cell and inbent to inner margin preceded by some fine white lines to submedian fold and diverging on costa; medial area with some grayish and faint cinnamon irrorations; a wavy jet black line follows the antemedial, and a dentate similar line precedes the postmedial, and consists partly of cuneiform spots; a small white spot on discocellular; postmedial line narrow, white, lunular dentate edged with jet black almost vertical from costa, inbent below vein 4, followed by diffuse grayish and cinnamon scaling to the black lunular dentate subterminal line; a wavy black line, from the subterminal at vein 6 to apex, mottled above with white and gray and preceded by a fuscous black space expanding at costa; a similar fuscous black spot, from vein 2 to inner margin at tornus, edged outwardly with white; a broken marginal black line partly defined by white scaling; some grayish shading on termen; cilia black with white spots on interspaces. Hind wing fuscous black; an antemedial white patch from costa to below cell; a postmedial series of small white spots forming a distinct line below middle, upcurved at inner margin, with two other curved short white lines above it on inner margin, all separated by black lines; the postmedial spots edged above by a dentate black line and some very small white spots; cilia white at anal angle, otherwise black with white spots. Fore wing below with fuscous streaks in and below cell; costa and outer half thickly irrorated with white scales; a white line on discocellular; postmedial line black edged with white, more distinctly on inner side; some white scaling at apex. Hind wing below: Base white irrorated with deep mouse gray; a fuscous dentate medial line; postmedial line broader, black, deeply dentate, edged with white, on basal side the white edged by a fine dark line; termen thickly irrorated with white.

Expanse, 118 mm.

Habitat—Ecuador.

Type—Cat. No. 34401, U. S. N. M.

Protoparce florestan ishkal, new subspecies

Male.—Palpi white, tipped with pale smoke gray. Head, thorax, and fore wing pale smoke gray; a fine black line from shoulders curved at front of collar, also extending below shoulder as a thick black line along outer edge of tegulae. Abdomen above mottled with dark scales; segmental black lines; subdorsal black spots on basal segment; a lateral black line expanding at segmental lines, except on three terminal segments; a sublateral fine fuscous line; body below white with ventral fuscous spots on terminal segments. Fore wing irrorated with fine black scales, in places absent, forming whitish edging to the postmedial lines, also to the antemedial line proximally; a black basal and a subbasal spot on costa, and an intermediate spot near base of cell; antemedial line lunular, inbent below cell; medial line double, lunular, black, outcurved, below cell fainter inbent, parallel with antemedial, incurved to near base on inner margin; a white point on discocellular, followed by an interrupted black line crenulate below vein 4 to inner margin; postmedial line outcurved, triple below vein 5, finely crenulate and incurved below vein 4,

partly edged with white towards inner margin; subterminal line outbent from costa to vein 6, where it is connected with the apex by an irregular black line, below vein 6 the line crenulate on interspaces and disconnected; small marginal black lunules at veins 3 and 4; cilia white with black spots at veins. Hind wing: Costa whitish to postmedial line; basal third benzo brown; thick fuscous black streaks from base below cell and before inner margin to medial line; inner margin cinnamon drab; medial line broad, fuscous black, excurved and downcurved at inner margin followed below vein 5 by whitish and crossed by a downcurved fine black line at inner margin; postmedial line broad from costa, fuscous black, suffusing with the fuscous termen to vein 5, diminishing in width towards anal angle; termen from below vein 5 broadly pale smoke gray; cilia as on fore wing. Wings below with the termen broadly dark cinnamon drab with fine whitish irrorations on outer half. Fore wing: Costa grayish; inner margin from cell and to postmedial line whitish; postmedial outcurved at costa and inbent, parallel with termen, benzo brown, edged on either side with whitish. Hind wing white with dark irrorations on costa, in cell, and beyond medial line, the latter thick, benzo brown, irregular, and somewhat dentate; postmedial line fine, dentate, becoming indistinct towards inner margin. Female the same as male, but the termen of hind wing less extensively gray, but with a broad white patch on inner margin between the two lines.

Expanse, male 100 mm., female 112 mm.

Habitat.—Tehuacan, Mexico.

Type.—Cat. No. 34476, U. S. N. M.

An examination of the genitalia shows this to be a good subspecies of *P. florestan* Cr.

The longitudinal black lines on fore wing of *P. florestan* are entirely absent.

Protoparce florestan cabnal, new race

Male.—The fore wing with a large medial space mottled cinnamon drab and rufous, irregularly triangular with its apex at vein 2, and with short black streaks on veins 3 and 4 near cell; the subterminal black line is fine wavily lunular, outwardly with drab scaling and a dentate whitish line, below vein 2 the drab scaling becoming cinnamon drab; cilia white interrupted by black lines.

Expanse, Male 92 mm., female 140 mm.

Habitat.—Jalapa, Mexico; Texas.

Type.—Cat. No. 34477, U. S. N. M.

This race seems confined to the temperate district of Eastern Mexico, extending into Brownsville, Texas.

Ceratomia igualana, new species

Male.—Palpi fuscous black, heavily fringed with white on first and second joints. Head, thorax, and abdomen above dark drab gray; a velvety black line, medially angled on front of collar, outbent on collar, and continued along outer edge of tegulae and a fine line on dorsal edge of tegulae; metathorax somewhat paler; abdomen dorsally with a fine interrupted black line, sub-dorsal whitish points at the lunular black lateral line; abdomen below whitish; thorax below with a lateral broad black line. Fore wing dark drab gray; a white point at base; a fine darker curved subbasal line and a similar double antemedial line; a more distinct black line, closely accompanied by a faint line, outbent from costa before middle to median, then angled and inbent

to inner margin at antemedial line; postmedial line black, outcurved, well marked, below vein 4 inbent to middle of inner margin, and closely followed by a double, fainter, lunular line; subterminal line fine, black, outcurved from costa to vein 4, then slightly incurved; a black streak above veins 2 and 3 from cell to subterminal line; a wavy black streak from subterminal above vein 6 to apex; two shorter streaks from subterminal at veins 3 and 4 with hooks at termen; a white dark-edged point at end of cell. Hind wing fuscous with paler shading on costa and postmedially; short black and white streaks at anal angle. Fore wing below brownish drab; a pale line at discocellular; traces of a postmedial double dark line. Hind wing below somewhat paler than fore wing, the inner margin white from base to near termen; postmedial line faint. Cilia of both wings white with fuscous spots at veins.

Expanse, 57 mm.

Habitat.—Iguala, Mexico.

Type.—Cat. No. 34471, U. S. N. M.

Nannoparce balsa, new species

Female.—Palpi white, mottled with some fawn-color hairs and with a black streak above. Head and collar mouse gray; a black dorsal line on vertex, expanding on collar. Thorax medially pallid mouse gray; tegulae mouse gray, dorsally edged by a broad black line not reaching tips, outwardly edged with white. Abdomen above mouse gray with a dorsal black line and a subdorsal irregular line; body below white with black tufts at base of fore wing. Fore wing pale mouse gray with slightly darker suffusions; an irregular subbasal fine dark line and a fuscous spot at base of inner margin; a double antemedial fuscous line forming an annulus in cell, very indistinct from below cell; a double medial line from costa, also forming an annulus in cell; postmedial line faint, double, minutely dentate, slightly outbent to vein 4, then incurved, preceded by a darker quadrate spot from veins 5 to 7, crossed by short fuscous streaks; subterminal line outcurved and incurved below vein 4, suffusing with the postmedial; a black line from postmedial above vein 6 to apex; black streaks above veins 3 and 4 from cell to postmedial line; short black streaks on veins at termen crossing the white cilia. Hind wing fuscous gray, the inner margin white; a medial whitish gray shade; terminal shade with darker streaks on interspaces. Fore wing below light drab with faint traces of a postmedial darker line. Hind wing below with the inner margin more broadly white.

Expanse, 70 mm.

Habitat.—Balsas, Mexico.

Type.—Cat. No. 34472, U. S. N. M.

Hyloicus merops monjena, new race

Male.—Palpi grayish drab, fringed with paler white-tipped hairs. Head and thorax grayish drab. Collar and dorsal half of tegulae benzo brown, finely edged with black, the outer half of tegulae white, mottled with cinnamon drab scales. Abdomen as in *H. merops*. Fore wing thickly mottled white, benzo brown, and light cinnamon drab; a short black line at base of costa and below cell, the latter with some black hairs below it; a broad whitish space below cell to medial line and a narrower buffish streak from cell to postmedial; antemedial line double on costa, the outer part close and parallel

with medial line, deeply outcurved, inangled on pale space where it is cinnamon buff; medial line fine, double, fuscous, deeply outcurved with black points on it at costa and below cell, from vein 2 inbent to inner margin near base; a small whitish spot edged with black and containing a black point on discocellular; no second spot above it; postmedial line very faint, double on costa, with some whitish scales below costa, then deeply excurved, dentate, partly edged proximally with some whitish spots, a very fine black line from it at vein 6 to vein 7 near termen where it is broken and above vein 7 extends to apex; the postmedial is followed by a drab shade to subterminal, this latter outbent on costa, inwardly shaded with white, evanescent from vein 7 to near termen at vein 6, then wavy, black, inbent to vein 2 and bent downward to inner margin, followed by whitish gray scaling; a fine terminal black line, preceded by small black spots; on postmedial area vein 2 is white with black spots; cilia alternately white and drab. Hind wing above as in *H. merops*; the cilia white, without spots. Fore wing below rather grayer, with an outcurved fuscous post-medial macular line with faint traces of a line beyond cell. Hind wing below with costal half to postmedial light buff, thickly irrorated with drab; some black streaks below cell near base on a large white space to inner margin and postmedial line, this latter black, dentate from costa to vein 3, then broad and downcurved, followed throughout by a broad white space; termen grayish irrorated with drab; large fuscous quadrate blotches on interspaces.

Expanse.—112 mm.

Habitat.—El Monje, Loja, Ecuador.

Type.—Cat. No. 34404, U. S. N. M.

Hyloicus chisoya, new species

Female.—Head and thorax purplish gray, slightly mottled with paler hairs; fine oblique black lines from vertex across collar, continuing on tegulae; tegulae dorsally edged with a black line. Abdomen dorsally purplish gray, with a fine black dorsal line; a subdorsal black spot at base; lateral pale purplish gray spots on two following segments, then white spots on next three segments, all broadly edged with black; abdomen below light purplish gray, mottled with white between segments; a black ventral line. Fore wing purplish gray with oblique paler suffusions; a black spot at base of inner margin; a double antemedial fuscous line outcurved below cell and inbent to the black spot on inner margin, with pale suffusions above and below it; a fine black line in cell above median, and a short line above it in end of cell; heavier black streaks from cell above and below vein 3; a longer black streak above vein 5 crossing the postmedial; a postmedial fuscous shade faintly double, outcurved beyond cell and dentate, below vein 3 sinuous to middle of inner margin and outwardly edged with light purplish gray; from postmedial a fine black streak above vein 6 upturned and more heavily marked at vein 7, then oblique to apex; from vein 6 to vein 2 a slightly sinuous black line outwardly edged with white which gradually expands; a fine terminal black line; cilia fuscous with small pale spots. Hind wing fuscous; base pallid purplish gray and a similar broad postmedial shade downcurved above anal angle, its anterior half suffused with cinnamon drab; cilia white, spotted with black except at anal angle and on inner margin. Fore wing below hair brown; a postmedial inbent fuscous fascia with diffuse edging followed by a fainter outcurved dark shade; a fine black streak from vein 6 to apex. Hind wing below:

Base broadly purplish gray; a broad diffuse fuscous fascia followed by a broad pale purplish gray space; termen deep purplish gray, its proximal edge with black suffusions.

Expanse.—85 mm.

Habitat.—Mexico, without precise locality.

Type.—Cat. No. 44470, U. S. N. M.

Somewhat like Druce's figure of *H. perelegans* (*nec* Edwards) which was named by Rothschild and Jordan *H. mexicanus;* they figured a male which is again a very different species.

Hyloicus balsae, new species

Male.—Palpi white, irrorated laterally with fuscous, above thickly mottled with black, at third joint with wood brown. Head, collar, and thorax thickly mottled buffy brown and gray, the latter shade predominating on thorax dorsally; tegulae fuscous; two black lines diverging from vertex to tegulae, the latter edged with distinct black lines. Abdomen dorsally hair brown with a fine dorsal black line, and fine black segmental lines; laterally the segments black with white segmental lines; abdomen below whitish. Fore wing drab, suffused with gray, the lines black; a subbasal line; antemedial line double, fine, macular on costa and deeply outcurved, interrupted by veins, inbent below cell, the inner line forming a fine black line to base below median, there broadly edged below by a whitish shade, the outer antemedial cinnamon below cell where crossing the white shade, then obsolete; a double medial line, outangled in cell, slightly incurved below cell, and outcurved at median and inbent to base of inner margin forming two fine and distinct black lines; a fine black line from antemedial through cell, passing between the two white black-edged spots on discocellular to the postmedial line; black lines below veins 4 and 3 from cell to subterminal line; postmedial line wavy, outcurved, followed by another double line filled in with grayish white scaling, and cut by a grayish black-edged streak on vein 6 to termen above which is a black streak to termen close to apex; subterminal line well outcurved, sinuous, hardly traceable below vein 4; an inbent line from termen at vein 5 to vein 3; a fine terminal line; cilia white, mottled with black at veins. Hind wing black; some white at base; an antemedial white shade, expanding on inner margin; a thick white postmedial line, upcurved below vein 4 and downcurved to inner margin at anal angle; cilia as on fore wing. Fore wing below deep gray suffused with hair brown; a white discal point and faint traces of postmedial lines, edged with whitish at inner margin. Hind wing below: Costa and basal half to below cell drab, irrorated with cinnamon drab, the inner margin white; a postmedial fuscous black shade narrower and intensely black at inner margin, outwardly edged broadly with white; termen similar to fore wing.

Expanse, 72 mm.

Habitat.—Balsas, Mexico.

Type.—Cat. No. 34461, U. S. N. M.

Nearest *H. lugens* Walk. Brighter colored with distinct black longitudinal lines; the postmedial white line on hind wing more deeply upcurved before inner margin.

Cautethia simitia, new species

Female.—Palpi below grayish white. Body above drab gray, irrorated with darker gray and hair-brown scales; abdomen with fine black segmental lines above, laterally on basal half light buff, underside whitish except on terminal three segments. Fore wing drab gray, irrorated with darker scaling; traces of subbasal black patches between veins; antemedial line double, black, outangled on median vein; a small linear quadrate black spot at discocellular, the inner edge more heavily marked, a faint dark line above it on costa, and a short black line on vein 5 beyond it; postmedial line black, outwardly edged with whitish scaling, dentate from costa to vein 3, below vein 3 straight, more heavily marked, and vertical to inner margin; terminal space with a double series of dull drab patches on interspaces, connected by grayish white scaling; a fine terminal benzo brown line expanding on interspaces. Hind wing: Basal half orange, distal half fuscous.

Expanse, 34 mm.

Habitat.—Simiti, Colombia.

Type.—Cat. No. 34445, U. S. N. M.

Conspicuous by the absence of the fuscous oblique streak at tornus of fore wing, present in all the other species.

SATURNIIDAE

Rothschildia coxeyi, new species

Female.—Head and collar pinkish cinnamon, the latter edged with white. Thorax orange cinnamon. Abdomen pinkish cinnamon; a narrow transverse white line at base, a lateral white line divided by a cinnamon buff line; legs pinkish cinnamon, partly streaked with white. Wings above to postmedial line orange cinnamon; postmedial fine, fuscous, lunular dentate, outwardly white, followed by a narrow fuscous shade irrorated with lilacine white, then by a broad pale grayish vinaceous space distally deeply dentate on veins, narrowly edged with russet. Fore wing: an antemedial white line distally edged with fuscous, outbent to median, then inbent to near base of inner margin; the hyaline spot basally incurved, distally rounded across postmedial line, below strongly inbent, partly edged by a very fine black line; outer space brown, below vein 6 broadly ochraceous orange, limited by a fine lunular black line, above vein 6 a large white and pallid vinaceous-drab space to costa and apex, outwardly edged with ochraceous orange; between veins 6 and 7 the subterminal line enclosing a triangular black spot and a broken English red line; termen tawny olive. Hind wing: An incurved black and white line near base; the hyaline spot basally incurved, almost angular, constricted before crossing postmedial line, the broad pale grayish vinaceous space not so conspicuously dentate as on fore wing; the outer space orange cinnamon thickly irrorated with brownish drab; subterminal line fine, black, almost straight preceded by Hay's russet spots; below middle of costa an elongated oval hyaline spot edged with white and then a black line. Wings below to postmedial line clay color, the broad space beyond postmedial paler than above and extending to apex, the interspaces towards margin below vein 6 cinnamon buff. No antemedial line on fore wing; the oval spot below costa of hind wing very distinct.

Expanse, 118 mm.

Habitat.—Macas, Ecuador.

Type.—Cat. No. 34376, U. S. N. M.

Named in honor of its discoverer, W. Judson Coxey.

The whole appearance of the species is very distinct.

Automeris semicaeca, new aberration

Male.—Antenna, head, and collar cinnamon; thorax and abdomen above orange cinnamon; body below light pinkish cinnamon. Fore wing acute, somewhat falcate, orange cinnamon, the terminal space beyond line brownish vinaceous; lines light vinaceous cinnamon; antemedial vertical, inwardly dark edged; outer line from costa near apex to beyond middle of inner margin outwardly dark edged; a fine, small, dark annulus at discocellular filled in with light vinaceous cinnamon. Hind wing russet vinaceous; a small white spot at discocellular with a pointed dash of white scales extending from it distally; a fine subterminal lunular black line followed by a broader brazil red parallel line; termen narrowly light pinkish cinnamon. Fore wing below somewhat paler, more of a brownish vinaceous shade; a round black spot at discocellular containing a small white spot; outer line black, faintly wavy. Hind wing below russet vinaceous, suffused with pinkish cinnamon; a faint darker postmedial line; no discal spot.

Expanse, 72 mm.

Habitat.—Santa Catharina, Brazil.

An abberation of the reddish form of *Automeris memusae* Walker.

Hylesia coarya, new species

Male.—Antenna with red shaft and orange pectinations. Head, collar, and thorax purplish fuscous. Abdomen above raw sienna with transverse brussels brown lines, underneath vinaceous drab. Wings vinaceous drab. Fore wing: A thick fuscous line from base of costa, outbent to inner margin; a fine dark medial line outcurved to vein 2, then slightly outbent, suffusing with the similar postmedial line at inner margin; the postmedial outcurved on costa, then straight and inbent; a thick dark line on discocellular; the veins from medial line to termen finely darker; a pallid purple drab spot at apex. Hind wing: A faint darker medial shade, its edge dentate on veins; a faint subterminal shade. Wings below somewhat darker, the hind wing with a darker line from costa near apex to above middle of inner margin; the subterminal shade as above.

Expanse, 34 mm.

Habitat.—Coary, Amazons.

Type.—Cat. No. 34463, U. S. N. M.

The apex of fore wing slightly produced, rounded.

Hylesia cottica, new species

Male.—Antenna ochraceous buff. Head and thorax chaetura drab; abdomen mars brown, mottled with light buff hairs and with fuscous segmental lines. Fore wing hair brown, the medial space paler, the lines and veins finely darker; antemedial line very faint, vertical, the postmedial inbent; a faint dark shade on discocellular; a small pale smoke gray spot above vein 7 on termen; inner margin narrowly fuscous. Hind wing the same shade as medial space of fore wing, the inner margin with long darker hairs; faint traces of a subterminal line. Wings below of a uniform duller color. A distin-

guishing feature is the shape of the fore wing: The apex is bluntly produced and the termen more inbent than in the usual run of species, so the wing appears longer and narrower.

Expanse, 39 mm.

Habitat.—Moengo, Cottica River, Surinam.

Type.—Cat. No. 34464, U. S. N. M.

Hylesia huyana, new species

Female.—Head and thorax brownish drab. Abdomen cinnamon buff with clay color segmental lines. Fore wing light cinnamon drab, the terminal space pale ecru drab; an irregular darker subbasal line; a fine lunular antemedial line; a white line on discocellular; a fine dark somewhat lunular line from costa near apex to middle of inner margin. Hind wing light cinnamon drab, the veins finely darker; a fine dark line on discocellular; traces of a straight postmedial line from costa before apex to middle of inner margin, more distinct on underside. Fore wing below somewhat paler than above, the markings visible in transparency. The termen is more oblique than usual in Hylesia.

Expanse, 70 mm.

Habitat.—Yahuarmayo, Peru.

Type.—Cat. No. 34469, U. S. N. M.

Hylesia ileana, new species

Male.—Palpi burnt sienna. Head, collar, and tegulae cacao brown, the thorax walnut brown. Abdomen above grayish cinnamon, underneath clay color. Fore wing: Base russet vinaceous limited by a darker vertical antemedial line; medial space wider on costa than on inner margin, light russet vinaceous with a large oval russet vinaceous spot on discocellular; postmedial line vinaceous brown, slightly outcurved on costa, and inbent to inner margin; terminal space russet vinaceous, crossed by a subterminal light russet vinaceous shade from apex to tornus somewhat interrupted opposite cell; cilia kaiser brown. Hind wing deep brownish vinaceous, the veins finely darker; termen light russet vinaceous. Wings below deep brownish vinaceous, the veins darker. The fore wing is slightly produced at apex, but not acute.

Expanse, 36 mm.

Habitat.—Chiapas, Mexico.

Type.—Cat. No. 34462, U. S. N. M.

The paratypes are in the collection of Don Carlos Hoffmann, Mexico City.

Hylesia orbana, new species

Male.—Antenna cinnamon. Collar and thorax purple drab. Abdomen dull cinnamon, mottled with purple drab hairs on segments, leaving dull cinnamon segmental lines; ventral surface purple drab. Fore wing purple drab; some small antemedial pallid purple drab spots; postmedial line outcurved at costa, slightly inbent below vein 5, defined by irregular pallid purple drab scaling; a large fuscous spot at end of cell; some pale scaling on termen above vein 7. Hind wing largely purple drab; the costa paler; a postmedial and terminal light purple drab shade. Fore wing below darker; a dark streak on discocellular; postmedial and terminal paler shading. Hind wing below light cinnamon drab with darker postmedial and subterminal shading.

Female darker, the markings more of a dusky brown with fuscous suffusions at base; discal spot broader, not so round; postmedial shade broad; the termen darker shaded. Hind wing with darker veins and a curved line on discocellular.

Expanse, Male 52 mm., female 57 mm.

Habitat.—Boven, Surinam.

Type.—Cat. No. 34466, U. S. N. M.

Allied to *H. mixtiplex* Dognin.

Dysdaemonia avangareza, new species

Female.—Palpi and head benzo brown. Collar and thorax tilleul buff. Abdomen above ecru drab, underneath buffy brown; legs brownish drab. Fore wing tilleul buff suffused with avellaneous; faint traces of an outbent wood brown antemedial line; a double wood brown line widely separated, from near middle of costa, slightly excurved to the postmedial line at inner margin; a fine pale line on discocellular defined by cinnamon brown edging, followed by two elongated, large hyaline spots also finely edged with cinnamon brown, the spots distally rounded, the upper spot only slightly smaller and narrower; a fine vertical postmedial line, buffy brown, intercepted by the hyaline spots, the space beyond to outer line light cinnamon drab; outer line well marked, hair brown, outcurved below costa and inbent to postmedial line on inner margin; outer line irregularly followed by light vinaceous fawn; a large army brown spot on costa not reaching apex, its proximal edge incurved, its distal edge sinuous; some triangular fuscous brown spots from vein 3 to inner margin close to outer line; termen suffused with army brown from apex to below vein 3 expanding at vein 4; the crenulate margin mostly edged with cinnamon brown. Hind wing: Base as on fore wing, a faint darker antemedial line vertical from costa, curved just above postmedial and upbent to inner margin, broader and diffuse; post-medial line benzo brown outwardly shaded with dusky drab then light cinnamon drab to outer line, the latter buffy brown, broad to vein 6, then inbent fuscous, narrowing to inner margin; termen broadly pale vinaceous fawn, some army brown clusters of scales from below vein 3 to inner margin close to outer line, some subterminal army brown shading from costa to vein 6; termen narrowly suffused with army brown. Wings below cinnamon drab. Fore wing: The outer line buffy brown, not so outcurved at costa; postmedial line very faint. Hind wing: Postmedial line fawn color, outer line darker.

Expanse, 131 mm.

Habitat.—Avangarez, Costa Rica.

Type.—Cat. No. 34417, U. S. N. M.

Dysdaemonia guyaquila, new species

Female.—Palpi and head benzo brown. Collar and thorax vinaceous buff. Abdomen cinnamon drab. Fore wing: Costa mostly vinaceous fawn, mottled with drab; a dark line on base of median, space below light vinaceous fawn, covered with long hairs, outwardly limited by an outbent antemedial army brown line from below cell to inner margin; a sinuous outbent medial line from subcostal, preceded by light vinaceous fawn scaling, and broadly followed by fawn color which joins the postmedial line below vein 3, the space above it to costa light vinaceous fawn enclosing two hyaline spots, the upper spot quite small, neither of them with any edging; a fine dark line on discocellular with verona brown points at upper and lower angle of cell; post-

medial line mikado brown, slightly sinuous, and passing beyond the hyaline spots, outwardly shaded with sayal brown to near outer line which is fine, fuscous, outcurved at costa where it is preceded by some light vinaceous fawn scaling; on costa before apex an irregular Hay's russet spot; termen at apex light vinaceous fawn, otherwise largely deep brownish drab; beyond outer line a series of triangular liver brown spots on interspaces, except between veins 4 and 6; the spot above vein 6 more elongated; all these spots edged with light brownish drab. Hind wing from base to postmedial light brownish drab, the inner margin with long light vinaceous fawn hairs; from below cell an antemedial fawn color fascia curved to inner margin; postmedial line hazel, broadly shaded distally with cinnamon rufous; outer line faint from costa, from vein 5 to inner margin black, followed by light brownish drab; a subterminal series of dark spots coalescing towards costa; outer margin light vinaceous fawn, the termen from projection below vein 5 hazel. Fore wing below cinnamon drab, dark from postmedial to outer line; termen suffused with light vinaceous fawn. Hind wing below avellaneous to postmedial line; the outer line distally edged with light vinaceous fawn; some similar shading on termen.

Expanse, 132 mm.

Habitat.—Guayaquil, Ecuador.

Type.—Cat. No. 34416, U. S. N. M.

Copiopteryx phippsi, new species

Male.—Palpi and a line behind head blackish brown. Head pale pinkish cinnamon. Collar pinkish buff with a fine transverse sayal brown line. Thorax sepia, the shoulders avellaneous, mottled with vinaceous fawn. Abdomen above natal brown, underneath drab with a double hair brown line on basal half. Fore wing above: Costal margin on basal fourth pinkish buff with drab mottling; base below subcostal broadly sepia united by an ecru drab antemedial line, obliquely outcurved in cell, below cell slightly outbent and somewhat incurved above inner margin, this line outwardly edged by a fine dark line which extends on to costa as a black outangled line; from this line at subcostal a snuff brown line is outbent and curved to lower angle of cell, then upbent to a point on vein 4, is there upbent to costa, and downcurved to inner margin forming the postmedial line, the large space enclosed above it pale vinaceous fawn, irrorated with light drab, chiefly on costa; on this space is a small triangular hyaline spot, edged outwardly by a snuff brown sinuous fascia which extends above it to subcostal; the medial space below the line verona brown, suffused with brownish drab along the antemedial line, and before the postmedial from vein 2 to inner margin becoming pinkish buff; the postmedial line is followed by light drab, broadly from costa to vein 6, limited by a fine, wavily outcurved, dark line which is incurved below vein 6 and becomes black following closely the postmedial to inner margin, the light drab preceding it forming a broad line, partly edged with pinkish buff; the outer dark line is followed by narrow hyaline spots from above vein 5 to below vein 4; termen from costa to vein 5 suffused with drab and buffy brown; below vein 5 to near vein 3 a dark vinaceous brown shade, inner edge sinuous and excurved towards vein 3; terminal space above tornus pale vinaceous fawn, irrorated with drab, and with some dark points close to outer line; cilia mostly fuscous. Hind wing: Costal half light cinnamon drab; inner margin to postmedial line army brown; a medial curved darker line below cell, above it at inner margin a light drab patch containing a small semilunar hyaline spot; postmedial

line army brown, broad, downbent, and sharply angled and upbent towards inner margin, this line followed by a second line well below apex, becoming fuscous and thicker, where downbent on tail, also sharply angled and upbent to inner margin; a light buff shade between the postmedial and marginal lines where angled; the fuscous line extending to beyond middle of tail, the terminal portion dark tilleul buff. Wings below light buff with cinnamon drab and hair brown striae. Fore wing: Traces of a postmedial line from costa, the outer line distinct from vein 5 to inner margin. Hind wing with only the marginal lines.

Expanse, 100 mm.

Habitat.—Province of Rio, Brazil.

Type.—Cat. No. 3440, U. S. N. M.

I take pleasure in naming this species in honor of Senator Phipps who contributed generously to the purchase of the Dognin collection where this fine species was found.

This species is somewhat like *C. sonthonnaxi* André. The termen from vein 6 to apex is wavy, below vein 6 more inbent and not so deeply crenulate as in *C. sonthonnaxi*. It is also allied to *C. virgo* Zikan.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

THE ACADEMY

Memorial Resolution on the Death of Frank Wigglesworth Clarke

Dr. F. W. Clarke, one of the founders and a past president of the Washington Academy of Sciences and one of the stanchest supporters of its Journal peacefully passed away at his home in Chevy Chase, Maryland, on May 23, at the age of 84. In his death Science has lost a most notable and enthusiastic worker and the Academy one of its most distinguished and faithful members.

Dr. Clarke believed in research in fundamental principles rather than in applied science, although he realized that both were necessary, for, as he was often heard to say: "How can science be applied if there is no science to apply?" In 1872, at the age of 25, he advanced this principle when he submitted to the Smithsonian Institution his first manuscript on the *Constants of Nature*. Again, in 1878, in his address as chairman of the section of chemistry of the American Association for the Advancement of Science, after expressing his adherence to this principle, he lamented the fact that so little support was given to the study of the basic truths of nature and especially mentioned the lack of coöperation in what little work was being done in his own science, saying "What chemistry needs is combined effort upon some general plan." Undoubtedly, Clarke's repeated calls for close coöperation in scientific work materially influenced our present day attitude. He advocated the establishment of governmental research laboratories with skilled specialists before any of the present ones came into existence.

Clarke's instinctive critical ability enabled him to evaluate rapidly the work of other people and his systematic procedure made him a notable compiler, as evidenced by his *Constants of Nature*, his many reports on atomic weights, and finally his *Data of Geochemistry*, which went through five editions. The best part of his life was spent as Chief Chemist of the U. S.

Geological Survey, a position he filled for many years from his appointment in 1883.

Always kind and generous he reflected only the bright side of life to his associates. His witty and humorous remarks often helped to brighten the day for those who were in contact with him.

Now, Whereas, FRANK WIGGLESWORTH CLARKE, a past president of this Academy was long one of its most influential members and largely instrumental in reviving the publication of the Journal of the Academy in 1911, and

Whereas, he was recognized as an international authority on atomic weights and geochemistry, and was one of the first to compile tables of fundamental physical and chemical constants, so that by his death the Academy has sustained a distinct loss,

Therefore, be it resolved that the Academy express itself as appreciative of the high quality of his work and his long sustained interest in many varied fields of science. And further, that the sympathy of the Academy be extended to his bereaved family, that these resolutions be published in the Journal, and that a copy be transmitted to his family.

(Prepared for the Academy by W. T. SCHALLER, GEORGE STEIGER and R. C. WELLS.)

NEWLY ELECTED MEMBERS OF THE WASHINGTON ACADEMY OF SCIENCES

FREDERICK EUGENE FOWLE, Research Assistant, Smithsonian Astrophysical Observatory, was elected to membership in recognition of his contributions to astrophysics and in particular his researches on the absorption of solar radiation by atmospheric water vapor and atmospheric ozone. He has been Editor of the Smithsonian Physical Tables since 1910.

Dr. WILLIAM C. FRAZIER, Senior Bacteriologist, Research Laboratories, Bureau of Dairy Industry, was elected to membership in recognition of his contributions to the science of bacteriology and especially to the metabolism of bacteria.

Dr. PAUL S. GALTSOFF, Biologist in charge oyster fishery investigations, Bureau of Fisheries, was elected to membership in recognition of his contributions to experimental biology and in particular his researches on regeneration of sponges and physiology of Pelecypoda (Oyster).

ROY W. GORANSON, Physicist, Geophysical Laboratory, was elected to membership in recognition of his work on density distribution in the earth's crust and his work on thermodynamic relations in multi-component systems

DR. JOSEPH GRINNELL, Director, Museum of Vertebrata and Zoölogy, and Professor of Zoölogy, University of California, was elected to membership in recognition of his contributions to ornithology and zoögeography.

J. N. B. HEWITT, Ethnologist, Bureau of American Ethnology, was elected to membership in recognition of his researches among the Iroquoian Indian tribes, and particularly his work on the League of the Iroquois Nations.

H. H. T. JACKSON, Senior Biologist, Bureau of Biological Survey, was elected to membership in recognition of his contributions to systematic mammalogy.

DR. CARL CLARENCE KIESS, Senior Physicist, Bureau of Standards, was elected to membership in recognition of his work on the description and classification of spectra, comet and planetoid orbit observations and stellar spectra.

Dr. ALBERT E. LONGLEY, Associate Botanist, Division of Genetics and

Biophysics, Bureau of Plant Industry, was elected to membership in recognition of his work in cytology.

Dr. D. J. McAdam, Jr., Senior Metallurgist, Bureau of Standards, was elected to membership in recognition of his contributions to physical metallurgy and his studies of the corrosion of metals.

Dr. Harry John McNicholas, Physicist, Bureau of Standards, was elected to membership in recognition of his work in optics, colorimetry, reflectometry and spectrophotometry.

Thomas P. Pendleton, Chief Engineer, Aerotopograph Corporation of America, Washington, D. C., was elected to membership in recognition of his research and contributions to stereophotogrammetry as applied to phototopographic surveying and mapping.

James Lee Peters, Assistant in Birds, Museum of Comparative Zoölogy, Cambridge, Mass, was elected to membership in recognition of his contributions to systematic ornithology.

Dr. Joseph H. Roe, Professor of Biochemistry, George Washington University, was elected to membership in recognition of his contributions to biochemistry and in particular his researches on the chemistry of blood.

Dr. F. D. Rossini, Associate Scientist, Bureau of Standards, was elected to membership in recognition of his contributions to chemical thermodynamics.

Knowles Ryerson, Principal Horticulturist in Charge, Division of Foreign Plant Introduction, Bureau of Plant Industry, was elected to membership in recognition of his contributions to tropical and sub-tropical horticulture and in particular his services as head of the plant introduction work of the U. S. Department of Agriculture.

Dr. C. L. Shear, Principal Pathologist in Charge, Division of Mycology and Disease Survey, Bureau of Plant Industry, was elected to membership in recognition of his contributions to mycology and plant pathology.

Dr. A. H. Stang, Senior Materials Engineer, Bureau of Standards, was elected to membership in recognition of his work in determining the strength and other properties of engineering materials.

Dr. George Tunnell, Petrologist, Geophysical Laboratory, was elected to membership in recognition of his work on the phase-relations in systems containing iron oxide and copper oxide.

ANTHROPOLOGICAL SOCIETY

The Anthropological Society of Washington at its annual meeting held on January 19, 1932, elected the following officers for the ensuing year: *President:* J. N. B. Hewitt, Bureau of American Ethnology; *Vice-pressident:* Matthew W. Stirling, Bureau of American Ethnology; *Secretary:* Frank H. H. Roberts Jr., Bureau of American Ethnology; *Treasurer:* Henry B. Collins Jr., U. S. National Museum: *Representative of the Anthropological Society to serve as one of vice-presidents of the Washington Academy of Sciences:* N. M. Judd, U. S. National Museum; *Members of the Board of Managers:* Biren Bonnerjea, Catholic University; George S. Duncan, American University; Herbert W. Krieger, U. S. National Museum; Frank M. Setzler, U. S. National Museum; William Duncan Strong, Bureau of American Ethnology.

The following is a report of the membership and activities of the Society since the last annual meeting, held January 20, 1931.

Membership.

Life members	4
Active members	56
Associate members	6
Honorary members	23
Corresponding members	22
Total	111
Deceased during year	5
Associate 1	
Active 3	
Life 1	
Resigned, active	1
New Members, active	2

Financial Statement.

Funds invested in Perpetual Building Association	$1057.93
21 Shares Washington Sanitary Improvement Co., $10 par	210.00
2 Shares Washington Sanitary Housing Co., $100 par	200.00
Cash on hand	245.75
Total	$1713.68
Bills payable	5.80
Net Balance	$1707.88

Papers presented before regular meetings of the Society were as follows:

January 20, 1931. *Two Small Pueblo Ruins in the Zuñi Region*, by FRANK H. H. ROBERTS JR., archeologist, Bureau of American Ethnology.

February 17, 1931. *Archeological Explorations on St. Lawrence Island, Alaska*, by HENRY B. COLLINS JR., assistant curator of ethnology U. S. National Museum.

March 17, 1931. *The Mound-Builder Cultures of the Upper Mississippi Valley*, by FRANK M. SETZLER, assistant curator of archeology, U. S. National Museum.

April 21, 1931. *An Archeological Reconnaissance of the Hawaiian Islands*, by W. M. WALKER, associate anthropologist, Bureau of American Ethnology.

October 20, 1931. *Prehistoric Peoples of the Middle Missouri Valley*, by WM. DUNCAN STRONG, ethnologist of the Bureau of American Ethnology.

November 17, 1931. *The Cultural Background of the Present Situation in India*, by BIREN BONNERJEA, Professor of Bengali and Hindustani, Foreign Mission School at Catholic University.

December 15, 1931. *The Indians of the North Pacific Coast*, by EDWARD SAPIR, professor in anthropology, Yale University. This talk was the first in a series of five special lectures relating to the Indian tribes of western North America. The remaining four lectures were scheduled for the first part of 1932.

All of the meetings, with the exception of that held December 15, were in Room 42–43 of the new U. S. National Museum. The meeting of December 15th was held in the large auditorium of the same building. In accordance

with the custom of several year's standing all of the meetings held in January, February, March and April took place at 4:45 P.M. Beginning with the October meeting the time was changed to 8:00 P.M. The wisdom in this step was shown by the increase in attendance. Where the afternoon meetings had an average of 25, the evening gatherings passed the 50 mark. The special lecture by Dr. SAPIR had an attendance of 160.

The Society was unfortunate in its loss by death of five members. Dr. GEORGE A. DORSEY, associate member, died March 29, 1931. Mr. VICTOR J. EVANS, an active member, died February 1, 1931. Dr. GEORGE M. KOBER, life member, died on April 24, 1931. Mrs. LOUISE SIMPSON, active member, died in March 1931. Dr. HERMAN F. C. TEN KATE, active member, died February 4, 1931.

FRANK H. H. ROBERTS JR., *Secretary.*

Obituary

General GUSTAVE AUGUSTE FERRIÉ (born Nov. 19, 1868) died in Paris on Feb. 16, 1932, following an operation for appendicitis. He was Inspector General of the Military Telegraphic Service of France, Member of the Institute of the Academy of Sciences, and Commander of the Legion of Honor. He visited Washington in 1927, when he was President of the International Radio Congress held in this city.

Several institutions in Washington, notably the U. S. Coast and Geodetic Survey and the U. S. Naval Observatory, have been closely associated with Gen. FERRIÉ in international coöperative work of a scientific character. This was especially the case in 1926, when they coöperated with him in the world longitude determinations, planned and executed under the direction of Gen. FERRIÉ, which were designed to test the Wegener hypothesis.

Dr. FERDINAND CANU, paleontologist of Versailles, France, and known in the United States especially for the series of monographs on fossil and recent bryozoa published by the United States National Museum, died suddenly February 12, at his home, age, 69 years. As a teacher of science in the Paris schools, he became an authority on meteorology and paleogeography. Later he took up the study of the bryozoa and became the leading specialist in this field. In 1912 began the joint studies with R. S. BASSLER upon American fossil bryozoa which have continued uninterruptedly until the present and have made the National collections of these organisms one of the largest extant.